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Recent mass measurements and developments at ISOLTRAP

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High-precision mass measurements of radioactive ions are used to determine nuclear binding energies, which reflect all forces acting in the nucleus and are used to study among others nuclear structure, nuclear astrophysics and weak interaction.

For this, the ISOLTRAP mass spectrometer [1] uses various ion traps, including a tandem Penning-trap system and a multi-reflection time-of-flight mass spectrometer (MR-ToF MS) [2], where the latter is suitable for both mass separation and fast, precise mass measurements.

In this contribution, the first direct mass measurements of neutron-deficient ^{97}Cd and the excitation energy of the $^{97,\text{n}}\text{Cd}$ high-lying isomer along with a precise measurement of ^{98}Cd in the immediate vicinity of the self-conjugate doubly magic $N=Z=50$ ^{100}Sn will be presented. Furthermore the recent measurements of neutron-rich $^{209,210}\text{Hg}$ will be discussed.

Besides the introduction of ISOLTRAP's current setup, technical developments are presented, in particular the upcoming re-bunching system using a new Mini-RFQ following the MR-ToF MS, which is currently being commissioned. The latter will realize mass-selective re-trapping [3] to enable low-yield experiments with extremely abundant (molecular) isobaric contamination and overcome the limitation of systematic ToF shifts induced by space-charge effects [4].

[1] D. Lunney *et al.*, J. Phys. G: Nucl. Part. Phys. 44, 064008 (2017)

[2] R. N. Wolf *et al.*, Int. J. Mass Spectrom. 349-350:123–133 (2013)

[3] T. Dickel *et al.*, J. Am. Soc. Mass Spectrom. 28, 1079-1090 (2017)

[4] F. M. Maier *et al.*, Nucl. Instrum. Methods Phys. Res. A. 1056, 168545 (2023)

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